EXPLORING EARTH'S MYSTERIES
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Biology Greenhouse Area

Facility Environmental Monitoring Report

Calendar Year 2002

BROOKHAVEN
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Biology Department Greenhouse Area

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Summary of Results

Analysis of groundwater samples collected near the Biology Department's greenhouse area during CY 2002 indicates that greenhouse operations have not impacted groundwater quality. No pesticides were detected, and metals and nitrate levels are at concentrations that are consistent with established background levels. These findings have been consistent since the groundwater surveillance program at the greenhouse area began, in 2000. Assuming that the current controls on chemical use are maintained, it is recommended that the routine groundwater surveillance program for the greenhouse area be suspended. The wells will be maintained for the collection of routine water level measurements used to assess site wide groundwater flow patterns, and for potential future water quality sampling.

Background

The Biology Department facility (Bldg. 463) includes 11 greenhouses where various types of plants are grown for biological research. Eight of the greenhouses have dirt floors and three have concrete floors.

Pesticides and fertilizers have been routinely used in the greenhouses. Records also indicate that copper sulfate was applied to the dirt floors on an annual basis until the mid-1980s. During the Facility Review Project, the pesticide Endosulphan II was detected in soil samples collected from a dry well located within Greenhouse 10.

Environmental Monitoring Program

In accordance with the environmental surveillance requirements outlined in DOE Order 5400.1, BNL established a groundwater monitoring program at the greenhouse area to evaluate potential impacts to environmental quality. The monitoring program for the greenhouse area is described in the *BNL Environmental Monitoring Plan* (Daum et al. 2000; BNL 2002).

Monitoring Results

Groundwater

Two wells are used to monitor groundwater quality in the greenhouse area (Figure 1). The wells were sampled in September 2002, and tested for pesticides, metals, and anions. Groundwater monitoring results indicate that greenhouse operations are not affecting groundwater quality. Pesticides were not detected, and all water quality and most metals

concentrations were below the applicable New York State Ambient Water Quality Standards (NYSAWQS) (see Tables 1, 2, and 3). Sodium was detected at a concentration slightly above the NYSAWQS of 20 mg/L in well 084-36 (Table 3). The detection of low levels of sodium is not uncommon in wells located within the developed area of the site, and could be related to road salting operations.

Future Monitoring Actions

The following action is recommended:

- Terminate active monitoring. Maintain wells for routine water level measurements, which are used to evaluate site wide groundwater flow directions, and for potential future sampling.

References

BNL, 2002. B*rookhaven National Laboratory Environmental Monitoring Plan, CY 2002 Update (January 2002)*. BNL-52584 Update.

Daum, M., Dorsch, W., Fry, J., Green, T., Lee, R., Naidu, J., Paquette, D., Scarpitta, S., and Schroeder, G., 2000. *Brookhaven National Laboratory Environmental Monitoring Plan 2000* (March 31, 2000).

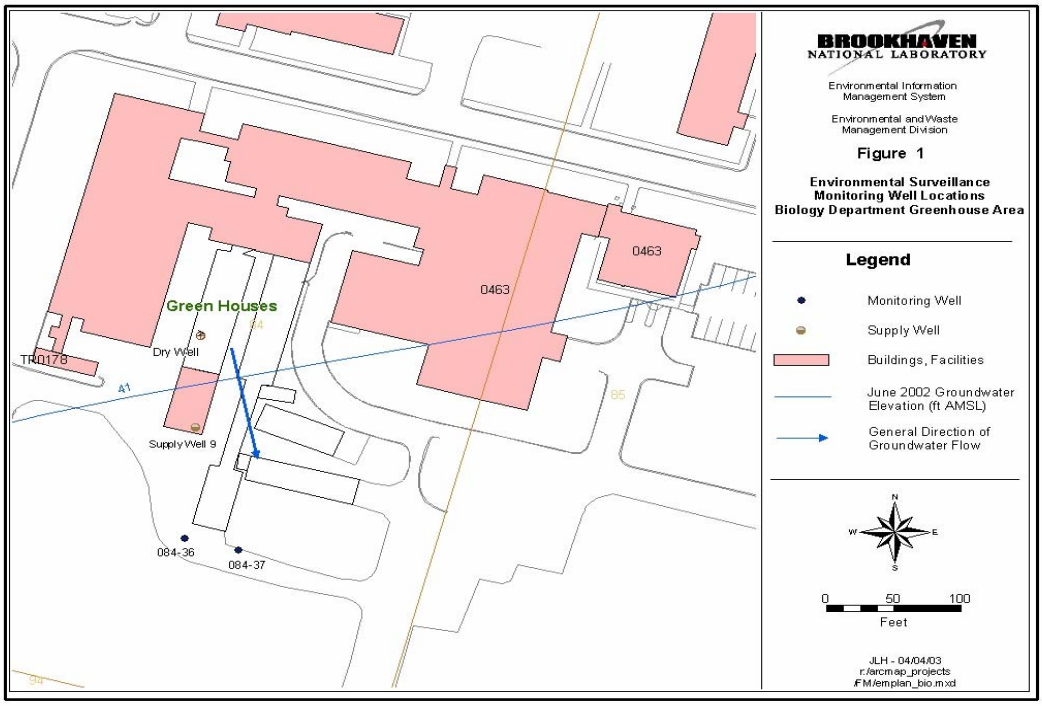

Figure 1. Location of monitoring wells in the Greenhouse Area.

Table 1. Pesticides Testing Results at the BNL Biology Greenhouse Area, CY 2002.

Well	Sample Period	Endosulfan II [a] (µg/L)
084-36	September	<0.1
084-37	September	<0.1
Typical MDL		0.1
NYSAWQS		50 [b]

Notes:
MDL = Minimum Detection Limit

[a] Endosulfan II was the primary contaminant of concern based upon the findings of the Facility Review Project. All other pesticides analyzed for using EPA Method 608 were non-detectable.

[b] Specific standard for this compound has not been established. Default standard is 50 µg/L.

Table 2. Water Quality Results at the BNL Biology Greenhouse Area, CY 2002.

Well	Sample Period	Chlorides	Sulfates	Nitrate
		----------(mg/L)----------		
084-36	September	40.8	20.4	3.6
084-37	September	16.5	16.7	2.2
Typical MDL		4.0	4.0	1.0
NYSAWQS		250	250	10

Notes:
MDL = Minimum Detection Limit

Table 3. Metals Results, Groundwater Monitoring at the Biology Greenhouse Area, CY 2002.

Well	Sample Period	Ag	Al	Cd	Cr	Cu	Fe	Hg	Mn	Na	Pb	Zn
		(mg/L)										
084-36	September	<0.001	0.005J	<0.001	<0.001	0.003	<0.075	<0.0001	<0.002	26.8	<0.0013	<0.004
084-37	September	<0.001	0.005J	<0.001	<0.001	0.002	<0.075	<0.0001	<0.002	15.4	<0.0013	<0.004
Typical MDL		0.001	0.002	0.001	0.001	0.002	0.075	0.0002	0.002	1.0	0.001	0.004
NYSAWQS		0.05	0.2(a)	0.01	0.05	0.2	0.3	0.0007	0.3	20	0.025	2.0(b)

Notes:
Primary potential contaminants shown. See database for complete data set.
J = Estimated concentration.
MDL = Minimum Detection Limit
(a) Drinking Water Standard – Secondary MCL for aesthetic quality.
(b) NYSDEC Guidance Value.